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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/568,420	07/17/2008	Takao Inoue	060105	7606

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EXAMINER	
CULLEN, SEAN P	

ART UNIT	PAPER NUMBER
1725	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/568,420	INOUE ET AL.	
	Examiner	Art Unit	
	Sean P. Cullen, Ph.D.	1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 February 2011*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. Claims 1-18 are pending.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. **Claims 1-4 and 14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Gozdz et al. (U.S. 2005/0233219 A1) in view of Yoshino et al. (U.S. 5,631,100 A) as evidenced by Timcal (SUPER P Technical Data Sheet).

Regarding **claim 1**, Gozdz et al. discloses a non-aqueous electrolyte battery (15) comprising:

- a positive electrode (see cathode, [0061])
- a negative electrode (see anode, [0061]), and
- a non-aqueous electrolyte (see electrolytic solution, [0061]),
- the positive electrode (see cathode, [0061]) having
    - a positive electrode active material-containing layer (3) formed on a positive electrode current collector (11, Fig. 4) and containing
        - an olivine-type lithium phosphate as a positive electrode active material (see electroactive material, [0063]),
    - wherein the positive electrode active material containing layer (3) contains a conductive agent (see Super P, [0085]),

- the conductive agent has a BET specific surface area of 15 m^2/g or greater (see Super P, [0085]), and

Gozdz et al. does not explicitly disclose:

- characterized in that the positive electrode current collector has a thickness of less than 20 μm, and
- a surface of the positive electrode current collector that is in contact with the positive electrode active material-containing layer has a mean surface roughness Ra of greater than 0.026 μm

Yoshino et al. discloses a non-aqueous electrolyte battery (Fig. 1) comprising a positive electrode current collector characterized in that the positive electrode current collector has a thickness of less than 20 μm (see 15 μm, C12/L59-62) and wherein a surface of the positive electrode current collector that is in contact with the positive electrode active material-containing layer has a mean surface roughness Ra of greater than 0.026 μm (C5/L26-32) to increase the adherence between the coating composition and the metallic foil and improve the high temperature characteristics of the secondary battery (C5/L26-32). Gozdz et al. and Yoshino et al. are analogous art because they are directed to non-aqueous electrolyte batteries. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the non-aqueous electrolyte battery of Gozdz et al. with the surface roughness of Yoshino et al. to increase the adherence between the coating composition and the metallic foil and improve the high temperature characteristics of the secondary battery.

Regarding the claim limitations that the conductive agent has a BET specific surface area of 15 m^2/g or greater, Gozdz et al. does not explicitly disclose the BET specific surface area of

Super P conductive carbon. Timcal discloses that Super P conductive carbon has a BET specific surface area of 62 m^2/g (see BET nitrogen surface area, Typical Values, P1). Therefore, the conductive agent of Gozdz et al. inherently possesses a BET specific surface area of 15 m^2/g or greater as evidenced by Timcal.

Regarding **claim 2**, modified Gozdz et al. discloses all claim limitations set forth above and further discloses a non-aqueous electrolyte battery:

- wherein the olivine-type lithium phosphate is lithium iron phosphate (see $LiFePO_4$, [0066]).

Regarding **claims 3 and 4**, modified Gozdz et al. discloses all claim limitations set forth above, but does not explicitly disclose a non-aqueous electrolyte battery:

- wherein the positive electrode current collector is an aluminum foil subjected to a roughened process and has a mean surface roughness Ra of less than 0.20 μm.

Yoshino et al. discloses a non-aqueous electrolyte battery (Fig. 1) wherein a surface of the positive electrode current collector that is in contact with the positive electrode active material-containing layer has a mean surface roughness Ra of greater than 0.1 μm to 0.9 μm (C5/L26-32) to increase the adherence between the coating composition and the metallic foil and improve the high temperature characteristics of the secondary battery (C5/L26-32). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have selected the overlapping portion of the ranges disclosed by the reference because selection of overlapping portion of ranges has been held to be a prima facie case of obviousness. In re Malagari, 182 USPQ 549.

Regarding limitations recited in claims 5 and 6, which are directed to method of making a roughened current collector it is noted that said limitations are not given patentable weight in the product claims. Even though a product-by-process is defined by the process steps by which the product is made, determination of patentability is based on the product itself and does not depend on its method of production. In re Thorpe, 777 F.2d 695, 227 USPQ 964 (Fed. Cir. 1985). Therefore, since the non-aqueous electrolyte battery as recited in claims 5 and 6 is the same as the non-aqueous electrolyte battery disclosed by modified Gozdz et al., as set forth above, the claim is unpatentable even though the non-aqueous electrolyte battery of modified Gozdz et al. was made by a different process. In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983).

Regarding **claim 14**, modified Gozdz et al. discloses all claim limitations set forth above and further discloses a non-aqueous electrolyte battery:

- wherein a portion of lithium sites in the positive electrode active material is substituted by a transition metal (see doped, [0063]).

4. **Claims 7-13** are rejected under 35 U.S.C. 103(a) as being unpatentable over Gozdz et al. (U.S. 2005/0233219 A1) in view of Yoshino et al. (U.S. 5,631,100 A) as evidenced by Timcal (SUPER P Technical Data Sheet) as applied to claims 1, 2 and 4 above, and further in view of Hosoya et al. (U.S. 2002/0124386 A1).

Regarding **claim 7**, modified Gozdz et al. discloses all claim limitations set forth above, but does not explicitly disclose a non-aqueous electrolyte battery:

- wherein the lithium iron phosphate has an average particle size of 10 μm or less.

Hosoya et al. discloses a non-aqueous electrolyte battery wherein the lithium iron phosphate has an average particle size of 10 μm or less (see 3.1 μm, [0055]) to improve the electronic conductivity of the cathode active material ([0055]). Gozdz et al. and Hoyosa et al. are analogous art because they are directed to lithium iron phosphate cathode active materials for non-aqueous electrolyte batteries. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the non-aqueous electrolyte secondary battery of modified Gozdz et al. with the average particle size as taught by Hosoya et al. to improve the electronic conductivity of the cathode active material.

Regarding **claims 8-12**, modified Gozdz et al. discloses all claim limitations set forth above, but does not explicitly disclose a non-aqueous electrolyte battery:

- wherein the positive electrode active material-containing layer has a filling density of 1.7 g/cm^3 or greater.
- wherein the positive electrode active material-containing layer has a filling density of 3.15 g/cm^3 or less.

Hosoya et al. discloses a non-aqueous electrolyte battery wherein the positive electrode active material-containing layer has a filling density of 0.4 g/cm^3 or greater and 2.0 g/cm^3 or less (see tap density, Table B-1) to increase the initial discharge capacity and capacity upkeep ratio (see tap density, [0236]). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the non-aqueous electrolyte secondary battery of modified

Gozdz et al. with the filling density as taught by Hosoya et al. to increase the initial discharge capacity and capacity upkeep ratio.

Although Hosoya et al. does not explicitly disclose a range of 1.7 g/cm^3 or greater and 3.15 g/cm^3 or less, Hoyosa et al. does disclose an overlapping range. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have selected the overlapping portion of the ranges disclosed by the reference because selection of overlapping portion of ranges has been held to be a prima facie case of obviousness. In re Malagari, 182 USPQ 549.

Regarding **claim 13**, modified Gozdz et al. discloses all claim limitations set forth above, but does not explicitly disclose a non-aqueous electrolyte battery:

- wherein carbon is superficially coated on, or adhered to, the positive electrode active material particles.

Hosoya et al. discloses a non-aqueous electrolyte secondary battery wherein carbon is superficially coated on, or adhered to, the positive electrode active material particles (see $LiFePO_4$ carbon composite material, [0044]) to increase the conductivity and capacity of the cathode active material. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the non-aqueous electrolyte battery wherein carbon is superficially coated on, or adhered to, the positive electrode active material particles as taught by Hosoya et al. to increase the conductivity and capacity of the cathode active material.

5. **Claims 15-18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Gozdz et al. (U.S. 2005/0233219 A1) in view of Hosoya et al. (U.S. 2002/0124386 A1) as evidenced by Timcal (SUPER P Technical Data Sheet).

Regarding **claim 15**, Gozdz et al. discloses a non-aqueous electrolyte battery (15) comprising:

- a positive electrode (see cathode, [0061])
- a negative electrode (see anode, [0061]), and
- a non-aqueous electrolyte (see electrolytic solution, [0061]),
- the positive electrode (see cathode, [0061]) having
    - a positive electrode active material-containing layer (3) formed on a positive electrode current collector (11, Fig. 4) and contains
        - an olivine-type lithium phosphate as a positive electrode active material (see electroactive material, [0063]) and
        - a conductive agent (see conductive additive, [0067]),
- the negative electrode (1) containing
    - a negative electrode capable of intercalating and deintercalating lithium (see anode, [0071])
- characterized in that the conductive agent has a BET specific surface area of 15 m^2/g or greater (see Super P, [0085]), and

Gozdz et al. does not explicitly disclose:

- the positive electrode active material-containing layer has a filling density of 1.7 g/cm^3 or greater.

Hosoya et al. discloses a non-aqueous electrolyte battery wherein the positive electrode active material-containing layer has a filling density of 0.4 g/cm^3 or greater and 2.0 g/cm^3 or less (see tap density, Table B-1) to increase the initial discharge capacity and capacity upkeep ratio (see tap density, [0236]). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the non-aqueous electrolyte secondary battery of modified Gozdz et al. with the filling density as taught by Hosoya et al. to increase the initial discharge capacity and capacity upkeep ratio.

Although Hosoya et al. does not explicitly discloses a range of 1.7 g/cm^3 or greater, Hoyosa et al. does disclose an overlapping range. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have selected the overlapping portion of the ranges disclosed by the reference because selection of overlapping portion of ranges has been held to be a prima facie case of obviousness. In re Malagari, 182 USPQ 549.

Regarding the claim limitations that the conductive agent has a BET specific surface area of 15 m^2/g or greater, Gozdz et al. does not explicitly disclose the BET specific surface area of Super P conductive carbon. Timcal discloses that Super P conductive carbon has a BET specific surface area of 62 m^2/g (see BET nitrogen surface area, Typical Values, P1). Therefore, the conductive agent of Gozdz et al. inherently possesses a BET specific surface area of 15 m^2/g or greater as evidenced by Timcal.

Regarding **claim 16**, modified Gozdz et al. discloses all claim limitations set forth above, but does not explicitly disclose a non-aqueous electrolyte battery:

- wherein the olivine-type lithium phosphate is lithium iron phosphate (see $LiFePO_4$, [0066]).

Regarding **claims 17 and 18**, modified Gozdz et al. discloses all claim limitations set forth above, but does not explicitly disclose a non-aqueous electrolyte battery:

- wherein the positive electrode active material-containing layer has a filling density of 3.15 g/cm^3 or less.

Hosoya et al. discloses a non-aqueous electrolyte battery wherein the positive electrode active material-containing layer has a filling density of 0.4 g/cm^3 or greater and 2.0 g/cm^3 or less (see tap density, Table B-1) to increase the initial discharge capacity and capacity upkeep ratio (see tap density, [0236]). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the non-aqueous electrolyte secondary battery of modified Gozdz et al. with the filling density as taught by Hosoya et al. to increase the initial discharge capacity and capacity upkeep ratio.

Although Hosoya et al. does not explicitly discloses a range of 1.7 g/cm^3 or greater, Hoyosa et al. does disclose an overlapping range. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have selected the overlapping portion of the ranges disclosed by the reference because selection of overlapping portion of ranges has been held to be a prima facie case of obviousness. In re Malagari, 182 USPQ 549.

6. Applicant's arguments with respect to claims 1-18 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sean P. Cullen, Ph.D. whose telephone number is 571-270-1251. The examiner can normally be reached on Monday thru Thursday 6:30 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Basia Ridley can be reached on 571-272-1453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. P. C./
Examiner, Art Unit 1725

/Basia Ridley/
Supervisory Patent Examiner, Art Unit 1725